

**UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health**

REPORT OF INVESTIGATION

**Surface Nonmetal Mine
(Limestone)**

Fatal Electrical Accident

July 27, 2006

**Adams Trucking Co., Inc.
Contractor I.D. No. 6MH
at
Specialty Minerals Inc.
Adams Mine
Adams, Berkshire County, Massachusetts
Mine I.D. No. 19-00035**

Investigators

**Daniel F. Pullen
Mine Safety and Health Inspector**

**Guy A. Constant
Mine Safety and Health Inspector**

**James R. Logan
Mine Safety and Health Inspector**

**Thomas D. Barkand
Electrical Engineer**

**William E. Slusser
Mine Safety and Health Specialist**

**Originating Office
Mine Safety and Health Administration
Northeast District
Thorn Hill Industrial Park
547 Keystone Drive, Suite 400
Warrendale, Pennsylvania 15086-7573
James R. Petrie, District Manager**



OVERVIEW

Jason M. Houran, contract laborer, age 25, was electrocuted on July 27, 2006, while using a gasoline-powered weed trimmer, equipped with a circular steel blade, to cut weeds and brush near a utility pole. The trimmer's blade severed the guy wire for the utility pole causing the wire to sag and contact a 23,000 volt energized supply conductor for the pole-mounted transformer.

The accident occurred because there were no procedures in place to ensure the guy wire on the Substation 15 utility pole was either grounded or equipped with insulator protection in accordance with the National Electrical Safety Code. Management failed to inspect and verify that the guy wire was installed properly to ensure that persons working or traveling in that area could safely perform their assigned tasks.

GENERAL INFORMATION

The Adams mine, a surface limestone operation, owned and operated by Specialty Minerals Inc., was located in Adams, Berkshire County, Massachusetts. The principal operating official was Paul R. Saueracker, President. The mine operated three 8-hour shifts per day, five days per week, and employed 164 persons.

Limestone was blasted from multiple benches and transported to the crushing plant by haul trucks where it is sized and processed into ground calcium carbonate, limestone, precipitated calcium carbonate, and lime. Finish products were sold for use in the paper, coatings, building materials, ceramic, glass, polymer, and food industries.

Adams Trucking Co., Inc. (Adams Trucking), an independent company, was located in North Adams, Berkshire County, Massachusetts. The principal operating official was Alan Dellaghelfa, owner. Specialty Minerals Inc. contracted with Adams Trucking to provide laborers to perform general clean-up and maintenance work at the mine. These employees reported to the mine daily to receive their work assignments.

The last regular inspection at this operation was completed on January 30, 2006.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Jason M. Houran (victim) reported for work at 7:00 a.m., his normal starting time. Houran and David Kustra, co-worker, began trimming weeds and brush around the mine with power trimmers equipped with metal brush cutting blades. At approximately 11:00 a.m., they began clearing brush around the Substation 15 area. They worked in opposite directions and planned to meet in the middle of the area. The area contained a cement block pump house and a utility pole.

About 11:45 a.m., Kustra was working with his back to the victim when he heard a “ping” sound (metal on metal) and then a loud bang. When Kustra turned, he saw Houran standing upright and shaking. Houran, who was not responsive when Kustra called his name, took a few steps and fell face down. Kustra ran to the quarry shop to get help and emergency medical personnel were called. Mine employees went to the scene, where they began Cardiopulmonary Resuscitation (CPR) on the victim. Shortly afterward, an emergency crew responded and transported the victim to a local hospital where he was pronounced dead. The cause of death was attributed to electrocution.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 11:58 a.m. on July 27, 2006, by a telephone call from Dave Buttelman, environmental manager, to James R. Petrie, district manager. An investigation was started that day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of miners. MSHA’s accident investigation team traveled to the mine, made a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA

conducted the investigation with the assistance of mine management and employees, the contractor management and employees, and personnel from the Massachusetts Department of Labor's Division of Occupational Safety. (Appendix A)

DISCUSSION

Location of the Accident

The accident occurred at the area surrounding the pump house and Substation 15 utility pole. The weather was cloudy and warm with a high temperature of 88 degrees Fahrenheit. The weather on the day of the accident was not found to be a contributing factor.

Description of Mine Power System

Massachusetts Electric, a National Grid company, supplied three-phase, 23,000 volt power to a metering pole from either of two selectable overhead supply lines. The two different overhead supply lines provided redundancy in the event that one overhead supply line was disrupted. Both overhead supply lines originated at the utility-owned, 115/69/23 kv substation located approximately one mile away from the mine.

The 23,000 volt power was supplied by three transformers at the utility-owned substation. The secondary sides of two transformers were connected delta and the third transformer secondary was connected neutral grounded wye. Since a grounded neutral conductor was not distributed with the three phase conductors, the ground fault electrical return path was through the earth.

The mine distributed power directly from the utility-owned metering pole using overhead power lines. A substation was not installed to isolate the mine overhead power system from the utility overhead power system.

The mine installed approximately 2,200 feet of 1/0 aluminum conductor between the metering pole and the accident location at Substation 15. Substation 15 consisted of three, individual, 23,000/480 volt, 167 kva transformers mounted on a utility pole. The transformers were connected in a 3-phase, delta/delta configuration. The primaries of the 3 transformers were supplied power through three, 15 ampere fuses. Three, 25 ampere isolation fuses were also installed approximately 1,200 feet upstream from Substation 15.

Lightning arrestors (27 kv) were provided at the top of the Substation 15 utility pole and grounded to a 6.74 ohm pole-ground. The secondary side of the pole-mounted transformers supplied 480 volt power to the pump house building. Various secondary loads were supplied from the pump house building, including lighting circuits, a 5-horsepower water pump motor, and a 150-horsepower mine sump pump motor.

The overhead supply line was terminated at the Substation 15 utility pole. A single guy wire was installed to secure the pole and counterbalance the weight of the transmission lines.

Guy Installation

A 7.5-foot long insulator, rated at 780 kv dry and 425 kv wet, was anchored to the top of the utility pole, 37.5 feet above ground level. The bottom end of the insulator was attached to a 34-foot long galvanized steel wire which stretched to an anchor imbedded in the ground. This anchor was installed 22.5 feet from the base of the pole. (Appendix B)

Spiral-wound, preformed wire loops were constructed from five, 0.1-inch diameter, galvanized steel wires twisted together to form a single 5/16-inch diameter wire strand. The guy wire tension caused the spiral-wound preformed loops wrapped onto the ends of the wire to grip the guy wire.

Installation of Power Service

In December 1998, Specialty Minerals, Inc. contracted Bemis Line Construction Co., Inc. to install the power service for the mine. The service, in part, consisted of the Substation 15 utility pole, guy wire, and three pole-mounted transformers. In 2004, the originally installed transformers were struck by lightning. Bemis Line Construction Co., Inc. was contracted to replace the damaged transformers with new transformers.

Electrical Details of the Accident

The spiral-wound preformed loop, attached to the anchor at ground level, was severed by the metal blade on the weed trimmer. Once severed, the tension and weight of the guy wire caused it to move 20.5 inches away from the anchor toward the pole. The spiral wound preformed loop attached to the upper portion of the guy dropped 29 inches onto the energized transformer supply conductor. This caused a phase to ground fault on the middle phase of the distribution line and energized the guy wire. It rapidly developed into a phase to phase fault causing two, 15 ampere, fuses on Substation 15 pole to open. Two, 25 ampere, isolation fuses approximately 1,200 feet away on the supply side also opened. The guy wire remained energized until Massachusetts Electric arrived and interrupted power to the entire mine site.

Power Trimmer involved in the Accident

The gasoline-powered trimmer involved in the accident was a Shindaiwa T270 that was equipped with an 8 ½ inch diameter metal brush cutting blade. The lower handle of the trimmer was comprised of a metal frame with a rubber mid-section. The left hand clamp on the rubber mid-section was missing, allowing the rubber section to slip from the metal frame. According to the manufacturer's operation manual, the power trimmer was to be operated with a shoulder harness and cutting guard. At the time of the accident, these two safety items were not being used. These defects were found to be violations; however, they were not found to contribute to the accident and were cited separately.

Training and Experience

Jason M. Houran had been employed by Adams Trucking Co., Inc. for 2 years and worked on this mine site for approximately 1 year and 8 months. There was no evidence that the victim had received 24-hour new miner training or site-specific hazard awareness training. These violations were not found to contribute to the accident and were cited separately.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root causes were identified:

Root Cause: Standards and controls were inadequate. Management failed to inspect and verify that the guy wire was installed properly.

Corrective Actions: Establish a formal system that requires management to plan, design, review, inspect, and test all installation or repair projects.

Root Cause: The provided guy wire on the power pole was not installed in accordance with the National Electrical Safety Code. The guy wire was not provided with two insulators installed to include the exposed section of the guy wire between them. The slackened guy wire contacted the energized transformer supply conductor below the provided insulator, thus energizing the wire.

Corrective Actions: Evaluate all electrical installations to ensure compliance with the required standards and codes. Inspect the work of independent contractors to ensure that installations and repairs to electrical systems are properly completed.

CONCLUSION

The accident occurred because the guy wire on the Substation 15 utility pole was not installed in accordance with the National Electrical Safety Code. The guy wire was not provided with the correct number of insulators to prevent the guy wire from becoming energized when it contacted the energized supply conductor on the utility pole.

ENFORCEMENT ACTIONS

Specialty Minerals, Inc.

Order No. 6038281 was issued on July 27, 2006, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on July 27, 2006 when a contractor's employee who was cutting brush and weeds with a weed trimmer contacted and severed a guy wire on a power pole at Substation 15. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the Substation 15 and surrounding area until MSHA has determined that it is safe to resume normal operations in this area. The mine operator shall

obtain prior approval from an authorized representative for all actions to recover and/or restore operations to the affected area.

The order was terminated on August 03, 2006. Conditions that contributed to the accident no longer exist and normal operations can resume.

Citation No. 6042037 was issued on July 27, 2006, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.12047:

A fatal accident occurred at this operation on July 27, 2006 when a contract laborer was electrocuted. The victim accidentally cut the guy wire to a utility pole with the metal blade of a weed trimmer causing the guy wire to sag and contact a 23,000 volt overhead supply conductor. The guy wire was not installed meeting the requirements of the National Electrical Safety Code, Part 2, entitled "Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines."

The citation was terminated on August 08, 2006. The guy wire was properly installed meeting the requirements of the National Electrical Safety Code.

Bemis Line Construction Co., Inc.

Citation No. 6042038 was issued on July 27, 2006, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.12047:

A fatal accident occurred at this operation on July 27, 2006 when a contract laborer was electrocuted. The victim accidentally cut the guy wire to a utility pole with the metal blade of a weed trimmer causing the guy wire to sag and contact a 23,000 volt overhead supply conductor. The guy wire was not installed meeting the requirements of the National Electrical Safety Code, Part 2, entitled "Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines."

The citation was terminated on August 08, 2006. The guy wire was properly installed meeting the requirements of the National Electrical Safety Code.

Approved: _____
James R. Petrie
District Manager

Date: _____

APPENDIX A

Persons Participating in the Investigation

Specialty Minerals, Inc.

Dave Buttelman	environmental manager
Leon Parrott	health and safety manager
David Ferris	regional manager, human resources
James Mulkey	director, manufacturing operations
Clive Beckington	maintenance manager
Paul LeSure	electrical supervisor

Adams Trucking Co., Inc.

Alan Dellaghelfa	owner
David Kustra	employee/witness

Bemis Line Construction

Rodney Bemis	owner
Dale Machegiani	lineman

Commonwealth of Massachusetts, DOL – Div. of Occupational Safety

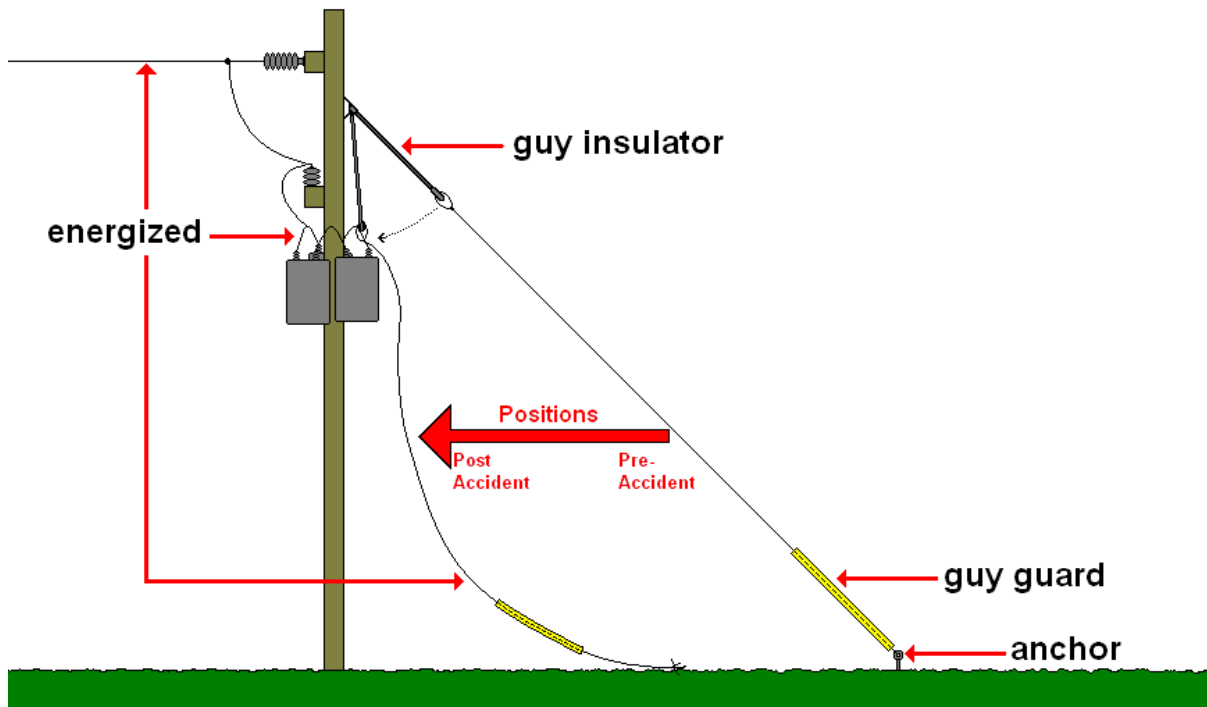
Ernest Kelley	asbestos and lead program manager
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Mine Safety and Health Administration

Daniel F. Pullen	mine safety and health inspector
Guy A. Constant	mine safety and health inspector
James R. Logan	mine safety and health inspector
Thomas D. Barkand	electrical engineer
William E. Slusser	mine safety and health specialist

APPENDIX B

Diagram Showing Substation 15 Utility Pole



(simplified drawing – not to scale)